

$$S^{(k)} = s^{(k)}$$



s_1

s_k

the Allies' captured
sample of German tanks

$$(S^{(k)} = s^{(k)}) \cap (N = n)$$



Germany's tank
population

$$N = n$$

two statements of conditional probability:

$$\pi(N = n \mid S^{(k)} = s^{(k)}) = \frac{\pi[(S^{(k)} = s^{(k)}) \cap (N = n)]}{\pi(S^{(k)} = s^{(k)})}$$

$$\pi(S^{(k)} = s^{(k)} \mid N = n) = \frac{\pi[(S^{(k)} = s^{(k)}) \cap (N = n)]}{\pi(N = n)}$$



Bayes' theorem

$$\pi(N = n \mid S^{(k)} = s^{(k)}) = \frac{\overset{\text{likelihood}}{\pi(S^{(k)} = s^{(k)} \mid N = n)} \overset{\text{prior}}{\pi(N = n)}}{\underset{\text{evidence}}{\pi(S^{(k)} = s^{(k)})}}$$

posterior